# Rock magnetic study in frontal thrust sediments of the Hikurangi margin, New Zealand: preliminary results at Site U1518, IODP Expedition 375

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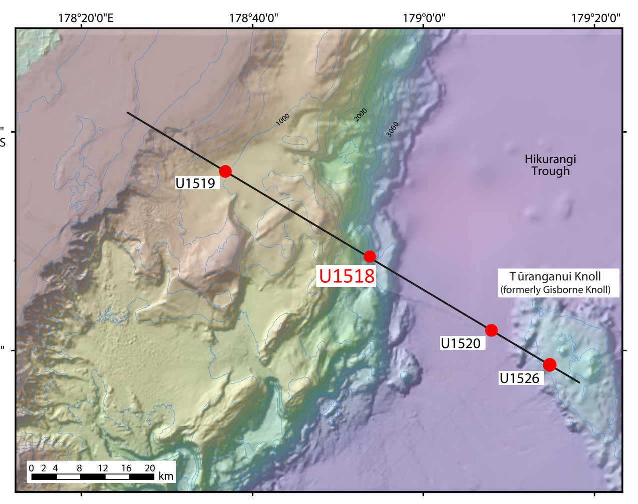
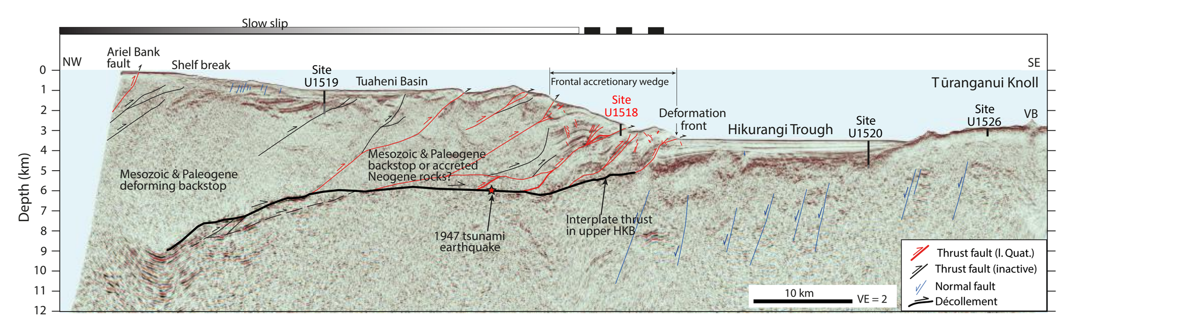
## I. STUDY SITE




*Wallace et al. (2019)*

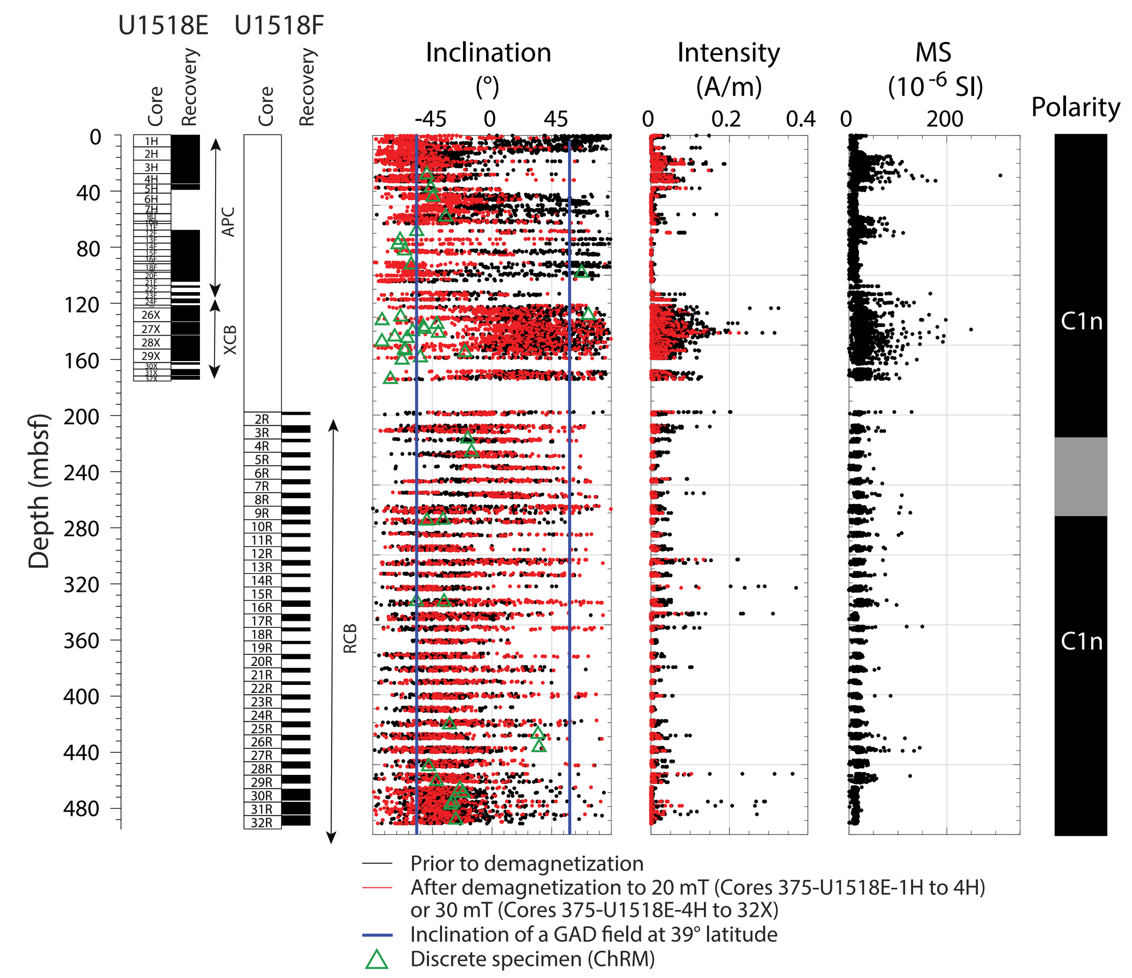
Site U1518 lies on the frontal accretionary wedge, ~6.5 km west of the deformation front . The objectives of logging and coring at Site U1518 were to define the structures and deformation, physical properties, age, thermal state, lithology and composition, and interstitial fluid geochemistry of the fault and surrounding sediments (Wallace et al., 2019).




*Wallace et al. (2019)*

Rather homogeneous lithology: mainly silty claystones with beds of siltstones, sand and ash layers.

## II. PALEOMAGNETIC SHIPBOARD RESULTS

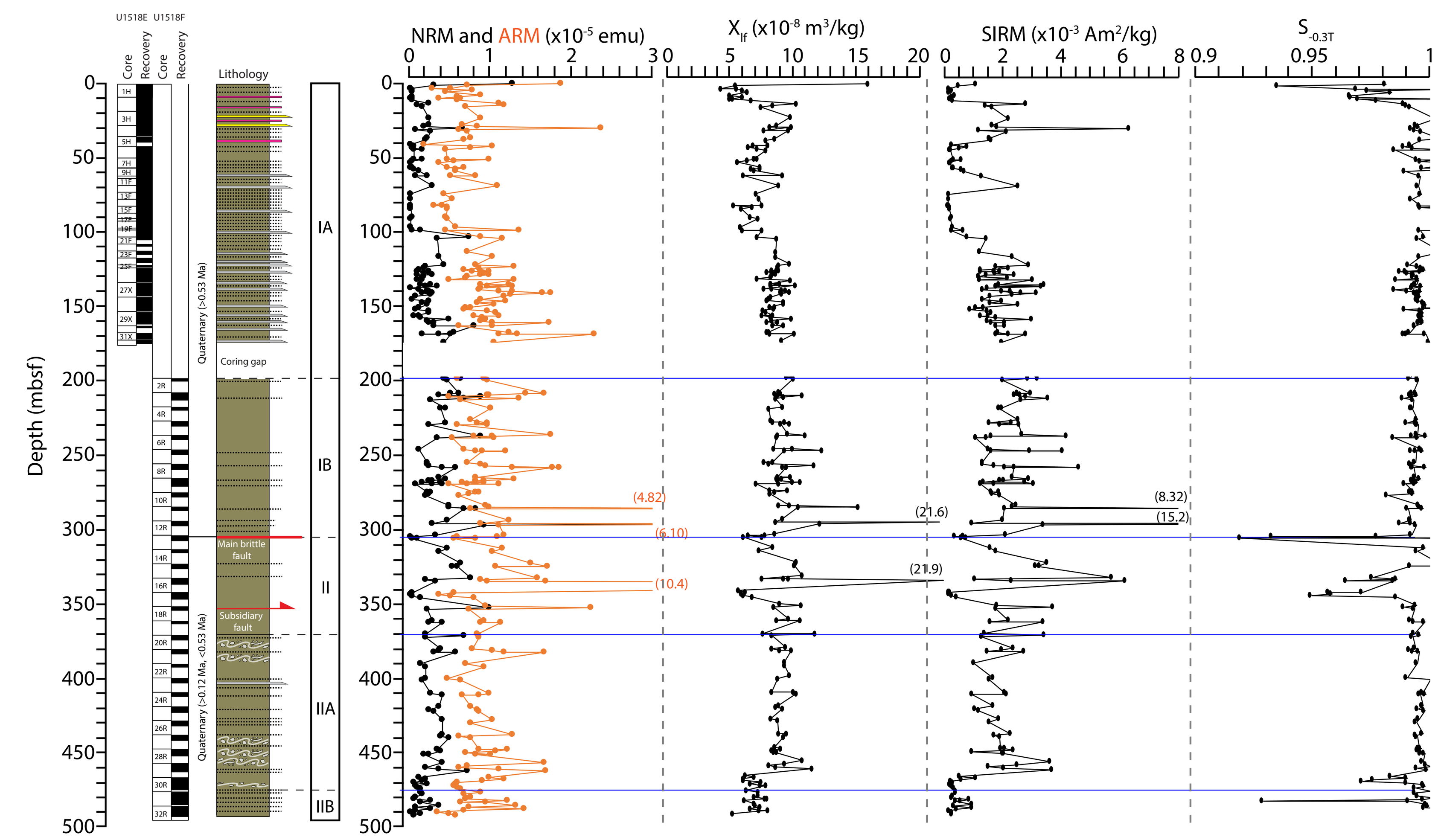



*Data from Wallace et al. (2019)*

Cored interval shows normal polarity (C1n), except for ~220-270 mbsf where it is undetermined because of steep bedding tilts.

Many samples acquire a GRM upon AF demagnetization at high field (> 60 mT).

## III. MAGNETIC PROPERTIES



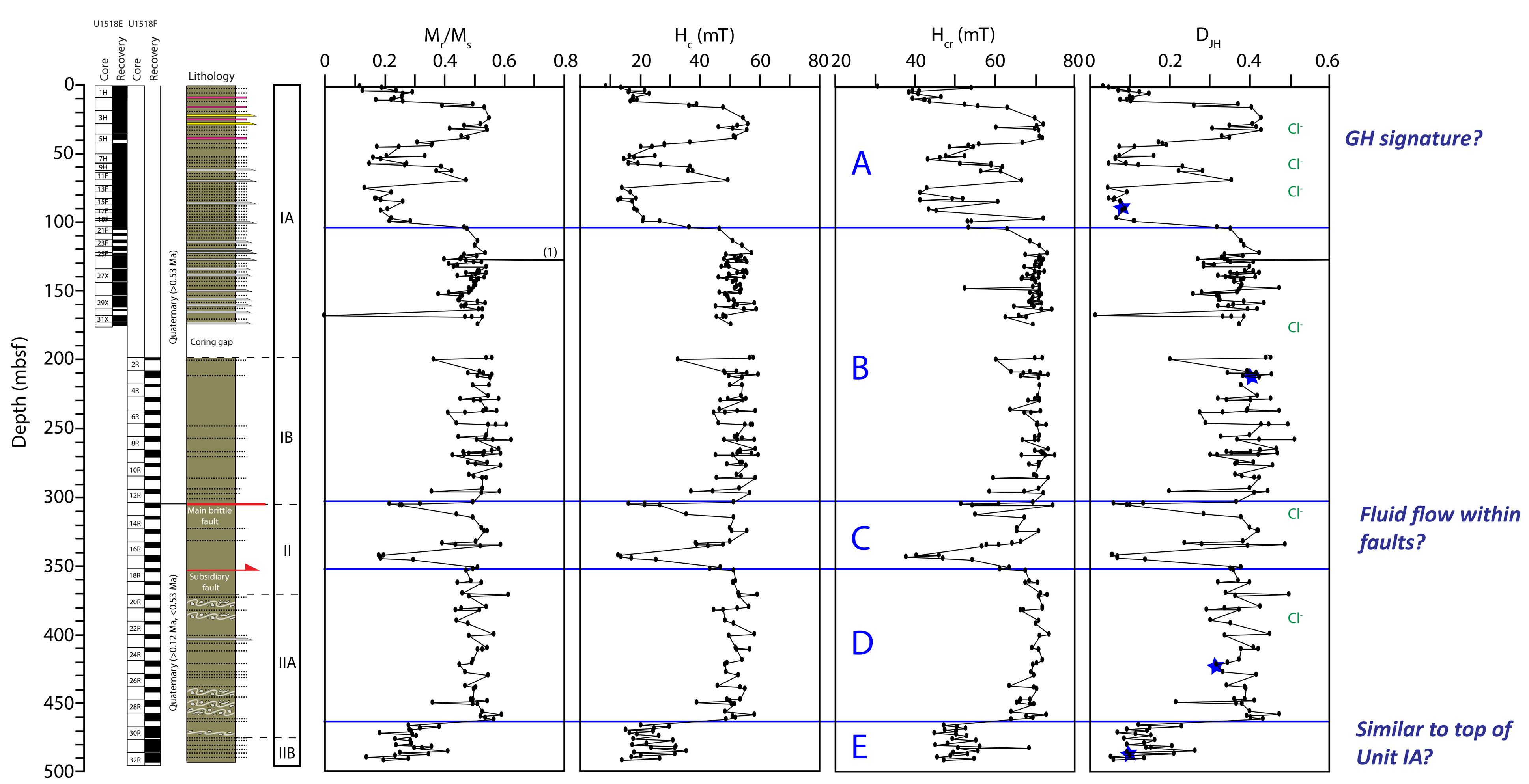

Concentration-dependent parameters mimic each other.

Downcore remanence and magnetic susceptibility don't show important variations.

Top of lithological Unit I and Unit IIB show lower parameters values.

High $S_{-0.3T}$ throughout the hole, except for some intervals where $S_{-0.3T}$ is lower (i.e., faults, coarser lithology?).

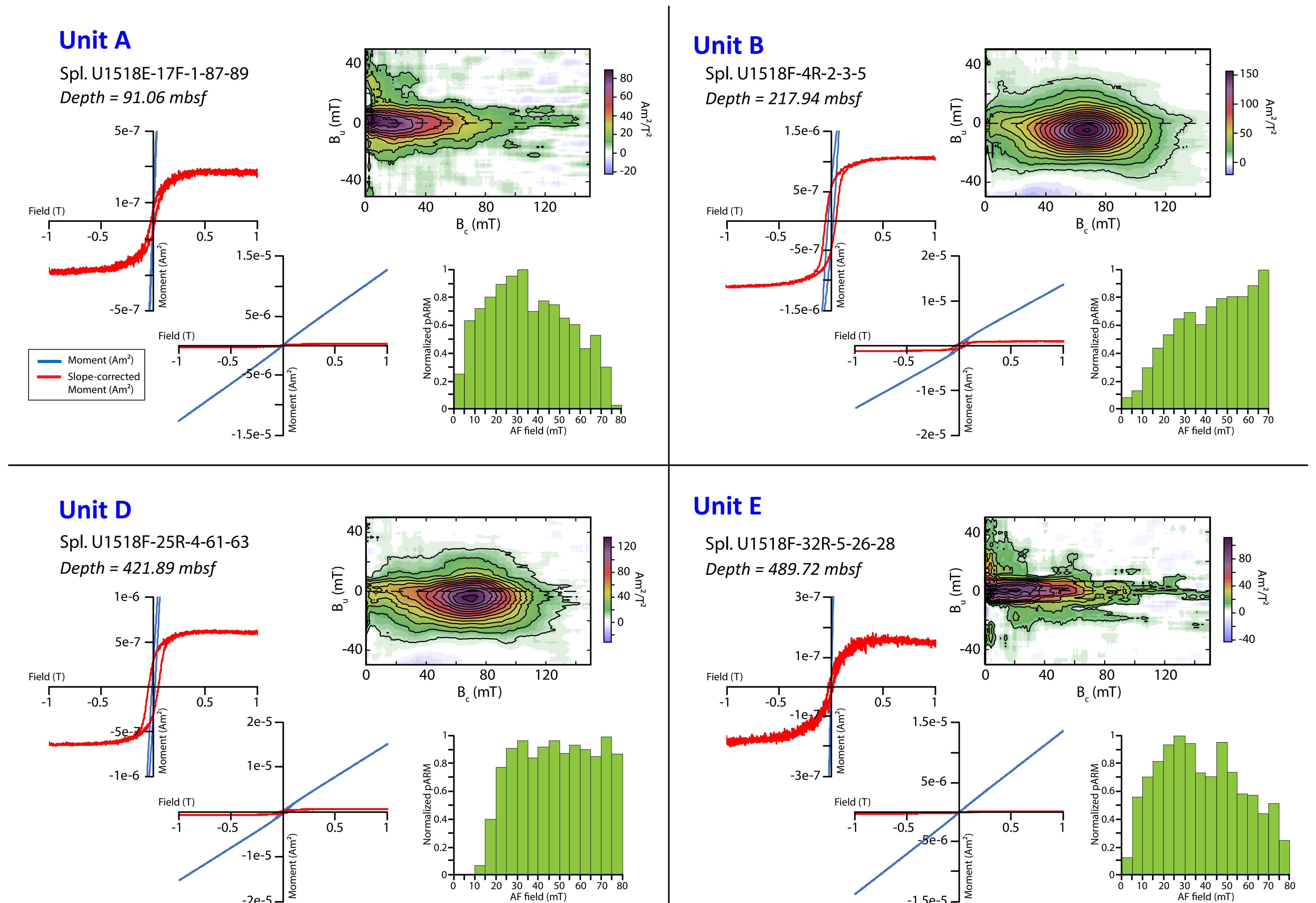
## IV. COERCIVITY STUDY




**Different coercivity units:**

- Unit A (0-104 mbsf): variable coercivity
- Unit B (113-303.5 mbsf): high coercivity
- Unit C (304-353 mbsf): variable coercivity
- Unit D (361-462.3 mbsf): high coercivity
- Unit E (466-492 mbsf): low coercivity

Low coercivity intervals in Unit C correspond to faults




High coercivity intervals (e.g. Units B and D) contain mainly SD greigite (mean $B_c$ ~60 mT)

Low coercivity intervals (e.g. within Unit A and Unit E) contain a mixture of likely low coercivity magnetite and high coercivity mineral (greigite?)

## V. FUTURE WORK

- Detailed characterization of the magnetic mineralogy:
  - FORC diagrams (higher resolution, irregular FORC)
  - IRM acquisition and unmixing
  - MPMS measurements
  - Thermomagnetic curves
  - SEM observations
- High resolution rock magnetic study in two sections showing negative thermal anomalies suggesting occurrence of gas hydrate
- Integration of the rock magnetic results with geochemistry profile and gas hydrate saturation

- What is the impact of fluid flow on rock magnetic properties and mineral assemblages?
- Could we identify a particular magnetic mineral assemblage associated with fluid flow and GH?

*Reference: Wallace, L.M., Saffer, D.M., Barnes, P.M., Pecher, I.A., Petronotis, K.E., LeVay, L.J., and the Expedition 372/375 Scientists, 2019. Hikurangi Subduction Margin Coring, Logging, and Observatories. Proceedings of the International Ocean Discovery Program, 372B/375: College Station, TX (International Ocean Discovery Program). https://doi.org/10.14379/iodp.proc.372B375.2019*